

Appl. No. 10/708,926
Amdt. Dated 11-21-2006
Reply to Office action of August 25, 2006

RECEIVED
CENTRAL FAX CENTER

NOV 21 2006

Listing of Claims:

1-9 (Canceled)

10. (Currently amended) A resistivity logging tool, comprising:
a propagation or induction resistivity antenna disposed on an elongated tubular having a longitudinal axis and adapted for subsurface disposal;
a lateral resistivity sensor disposed in a recess in the elongated tubular;
a shield disposed on and about the tubular to cover the recess and the lateral resistivity sensor; and

an insulating mechanism including a circumferential gap, the circumferential gap extending continuously about the tubular to prevent electric current flow in the shield in a direction parallel to the longitudinal axis of the tubular near the lateral resistivity sensor.

11. (Previously presented) The resistivity logging tool of claim 10, wherein the lateral resistivity sensor comprises a toroid.

12. (Previously presented) The resistivity logging tool of claim 10, further comprising an electrode disposed on the tubular, the electrode selected from one of a ring electrode, a button electrode, and a combination thereof.

13. (Previously presented) The resistivity logging tool of claim 10, wherein the lateral resistivity sensor comprises: an insulating base layer disposed in the recess in the tubular; and a toroidal antenna disposed over the insulating base layer.

14. (Previously presented) The resistivity logging tool of claim 13, wherein the toroidal antenna comprises a conductive wire disposed over the insulating layer.

Appl. No. 10/708,926

Amdt. Dated 11-21-2006

Reply to Office action of August 25, 2006

15. (Previously presented) The resistivity logging tool of claim 13, wherein the toroidal antenna comprises a toroidal core formed from one of a magnetically permeable material wrapped in the tubular recess or a ferrite material disposed in the recess.

16. (Previously presented) The resistivity logging tool of claim 10, wherein the lateral resistivity sensor includes a pressure compensating mechanism.

17. (Previously presented) The resistivity logging tool of claim 10, wherein the circumferential gap is a continuously extending gap incorporated in the shield.

18. (Previously presented) The resistivity logging tool of claim 17, wherein the circumferential gap is filled with an insulating material.

19. (Previously presented) The resistivity logging tool of claim 10, wherein the circumferential gap includes an electrically insulating material disposed between a junction formed between the shield and the tubular.

20. (Previously presented) The resistivity logging tool of claim 10, wherein a section of the shield positioned over the induction or propagation resistivity antenna comprises at least one slot filled with an insulating material.

21. (Previously presented) The resistivity logging tool of claim 10, wherein said recess contains both the induction or propagation resistivity antenna and the lateral resistivity sensor.

22. (Previously presented) The resistivity logging tool of claim 10, wherein the tubular is a drill collar.

23-34 (Canceled)

Appl. No. 10/708,926

Amdt. Dated 11-21-2006

Reply to Office action of August 25, 2006

35. (Currently amended) A method for building a resistivity tool using an elongated tubular having a longitudinal axis and adapted for disposal within a subsurface formation, comprising:

disposing a lateral resistivity sensor in a recess in the tubular;

disposing an induction or propagation resistivity antenna on the tubular;

positioning a shield assembly on and about the tubular to cover the recess and the lateral resistivity sensor; and

extending a circumferential gap continuously about the tubular and electrically between the shield assembly and the tubular, thereby preventing electric current to flow along the shield in a direction parallel to the longitudinal axis of the tubular near the lateral resistivity sensor.

36. (Previously presented) The method of claim 35, wherein disposing the lateral resistivity sensor comprises: disposing a base layer of an insulating material in the recess in the tubular; and assembling a toroidal antenna comprising a toroidal core and a conductive wire wound around the toroidal core, wherein the toroidal core comprises a magnetically permeable material wrapped around the insulating base layer.

37. (Previously presented) The method of claim 35, further comprising adapting the recess in the tubular with a pressure compensating mechanism.

38. (Canceled)

39. (Previously presented) The method of claim 35, wherein the circumferential gap is incorporated in the shield assembly and is filled with an insulating material.

40. (Previously presented) The method of claim 35, further comprising disposing an electrically insulating material between a junction formed between the shield and the tubular.

41. (Previously presented) The resistivity logging tool of claim 10, wherein the circumferential gap is incorporated into the tubular and positioned between the shield and the tubular.